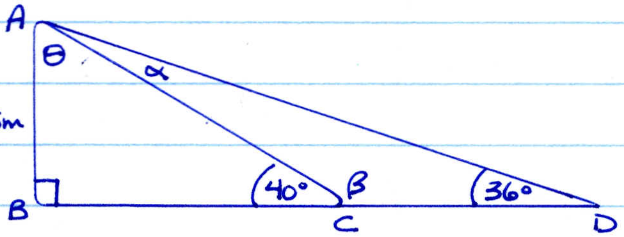
More Trig Practice

#2 (b)



For any triangle, sum of internal angles = 180°

Thus, for ΔABC

$$\theta = 180° - 90° - 40°$$
$$= 50°$$

$\beta = 180° - 40°$ $\longrightarrow$ For ΔACD, $\alpha = 180° - 140° - 36°$

$= 140°$ $\qquad\qquad\qquad\qquad$ $= 4°$

Using trig to determine the magnitude of the sides:

For $\underline{BC}$

$$\tan 40° = \frac{205}{BC}$$

$$BC \tan 40° = 205$$

$$BC = \frac{205}{\tan 40°}$$

$$= 244.3m$$

For $\underline{AB}$

$$\sin 40° = \frac{205}{AB}$$

$$AB \sin 40° = 205$$

$$AB = 205/\sin 40$$

$$= 318.9m$$

To determine CD, it is easier to first determine BD rather than use cosine law:

$\underline{BD}$

$$\tan 36° = \frac{205}{BD}$$

$$\therefore BD = 282.2\ m$$

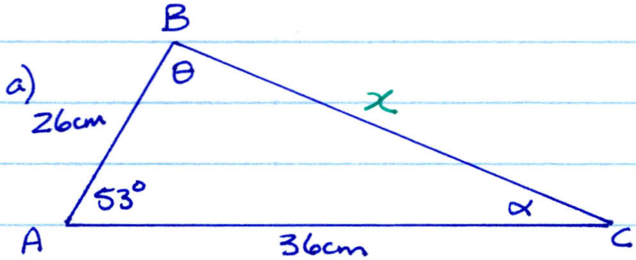
$$\therefore CD = BD - BC$$
$$= 282.2 - 244.3$$
$$= 37.9m$$

For $\underline{AD}$

$$\sin 36° = \frac{205}{\cancel{282.2}\ AD}$$

$$AD = 205/\sin 36$$
$$= 348.8m$$

#3 a)



$$C^2 = A^2 + B^2 - 2AB\cos C$$

$$x^2 = 26^2 + 36^2 - 2(26)(36)\cos 53°$$

$$= 845.4$$

$$x = 29.1\text{ cm}$$

To Determine θ

$$\frac{36}{\sin\theta} = \frac{29.1}{\sin 53°}$$

$$36\sin 53° = 29.1\sin\theta$$

$$28.75 = 29.1\sin\theta$$

$$\sin\theta = \frac{28.75}{29.1}$$

$$= 0.9880$$

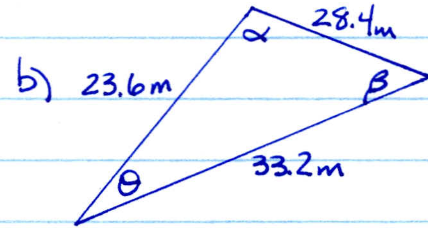
$$\theta = \sin^{-1}(0.9880)$$

$$= 81.1°$$

$$\therefore \alpha = 180 - 53 - 81.1$$

$$= 45.9°$$

b)



No Angles Given ⇒ Forced to use Cosine Law

Solve for θ

$$C^2 = A^2 + B^2 - 2AB\cos\theta$$

$$28.4^2 = 23.6^2 + 33.2^2 - 2(23.6)(33.2)\cos\theta$$

$$28.4^2 - 23.6^2 - 33.2^2 = -1567.04\cos\theta$$

$$-852.64 = -1567.04\cos\theta$$

$$\cos\theta = \frac{-852.64}{-1567.04}$$

$$= 0.5441$$

$$\theta = \cos^{-1}(0.5441)$$

$$= 57.0°$$

Now you can use sine law to derive any one of the other angles.